

Revision of the Genus *Pandanus* Stickman, Part 18 *Pandanus* of Christmas Island, Indian Ocean, and of the Anamba Islands, Indonesia

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FROM CHRISTMAS ISLAND in the Indian Ocean H. N. Ridley described two species of *Pandanus*. As these were never illustrated, they are given a revised treatment here. Previously Martelli had described a species from the same island, based solely upon fragmentary staminate material. The material of these species in the herbarium at Singapore has been studied anew and is here reported upon.

In the same herbarium is good material of a *Pandanus* from the Anamba Islands, at the northwest border of Indonesia.

SECTION *Pandanus*

Pandanus elatus Ridl. (sect. *Pandanus*), R. Asiat. Soc., Straits Br., Jour. 45:239-240, 1906
Figs. 215, 216

DIAGNOSIS OF LECTOTYPE: Tree; trunks few and together, 13.3-20 m tall, 15 cm in diameter; bark gray and sparingly thorny; prop roots few, hard, short; leaves 1.77-2.1 m long, 8-10 cm wide, coriaceous, furrowed above the midrib, 2-plicate, in section M-shaped, at midsection with 50-52 parallel secondary veins in each half, tertiary cross veins visible below in outer third forming short oblongs or rhombics, blade ligulate, tapering into a trigonous, subulate apex about 10 cm long, this about 5 cm down 1 mm wide, the base not seen, near the base the margins with spines 2-4 mm long, 4-7 mm apart, the first conical and divergent, the others subulate, ascending from a conic base, the tips red-brown; the midrib below near the base with spines 3 mm long, 11-22 mm apart, with a heavy conic base and a subulate reflexed tip; at midsection the margins with prickles 3-3.5 mm long, 4-10 mm apart, arcuate subulate, flattened;

the midrib below with prickles 2.5-3 mm long, 10-25 mm apart, broad subulate, flat, arcuate ascending; on the subulate apex the margins and midrib below with subulate serrulations 0.3-0.6 mm long, 1-3 mm apart; peduncle "2 feet long and 2½ inches thick"; syncarp solitary, 30-33 cm long, 17.5 cm in diameter, "oblong"; phalanges 7.5-7.7 cm long, 4.5-5.5 cm wide, 3.1-4 cm thick, cuneate-obovoid in profile, 6-7-angled, the side gently curving, smooth, shining, when dried brown, upper ⅓ free, the apex convex, lateral sutures mostly distinct, narrow and deep, central apical sinuses 5-20 mm deep; carpels 9-12, the apices lance-pyramidal, the outer ones more or less diverging, the inner erect and ½-¼ the size of the outer; stigmas 3-3.5 mm long, cordate, sharply oblique and centripetal, creased, brown, flush; proximal sinus usually running to the valley bottom; endocarp submedian, 35 mm long, bony, blackish brown, the lateral walls 3 mm thick, the inner surfaces shining; seeds 18-20 mm long, 5-6 mm in diameter, oblique ellipsoid; upper mesocarp cavernous in each carpel apex, with pale pith and a few fibers; basal mesocarp fibrous and fleshy.

STAMINATE PLANT: Leaves 1.78 m long, 5.5 cm wide, at midsection with 35 parallel secondary veins in each half, tertiary veins obscure, near the base the margins with prickles 1.5 mm long, 4-9 mm apart, stout arcuate subulate, ascending, brown-tipped; the midrib below with prickles 13-18 mm apart, heavy based but the tips broken off; at midsection the margins with prickles 1-1.5 mm long, 3-5 mm apart, stout subulate, flattened, arcuate ascending; the midrib below with prickles 1 mm long, 18-32 mm apart, arcuate, conic, ascending; on the subulate apex the margins and midrib below with subulate serrations 0.2-0.3 mm long, 1-2 mm apart; staminate inflorescence 45 cm long; peduncle fleshy; bracts colored, softer than the leaves; lowest floral bract 40 cm long, 4 cm wide, lance-

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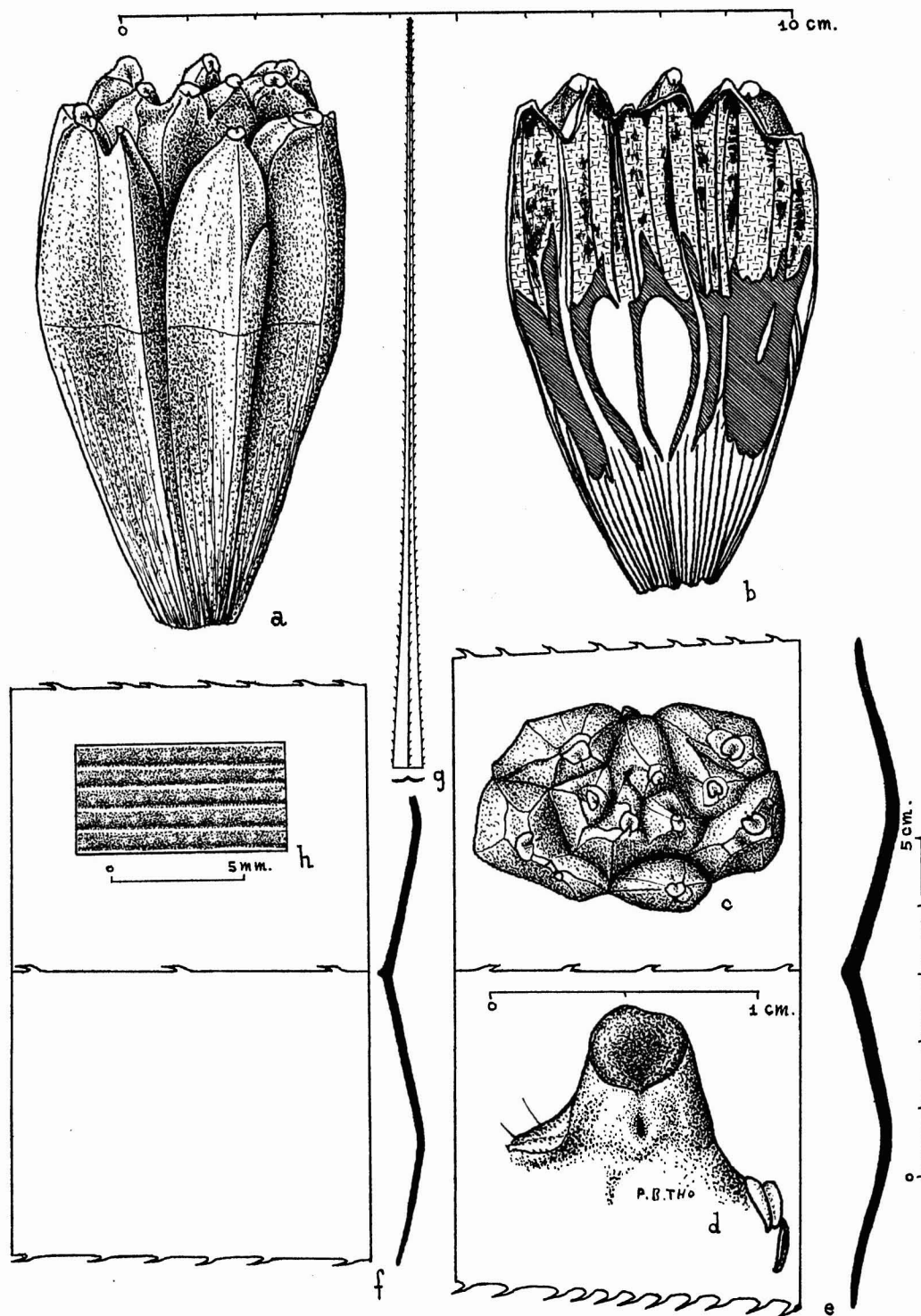


FIG. 215. *Pandanus elatus* Ridl., from holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$; *h*, leaf veins at middle, lower side, $\times 4$.

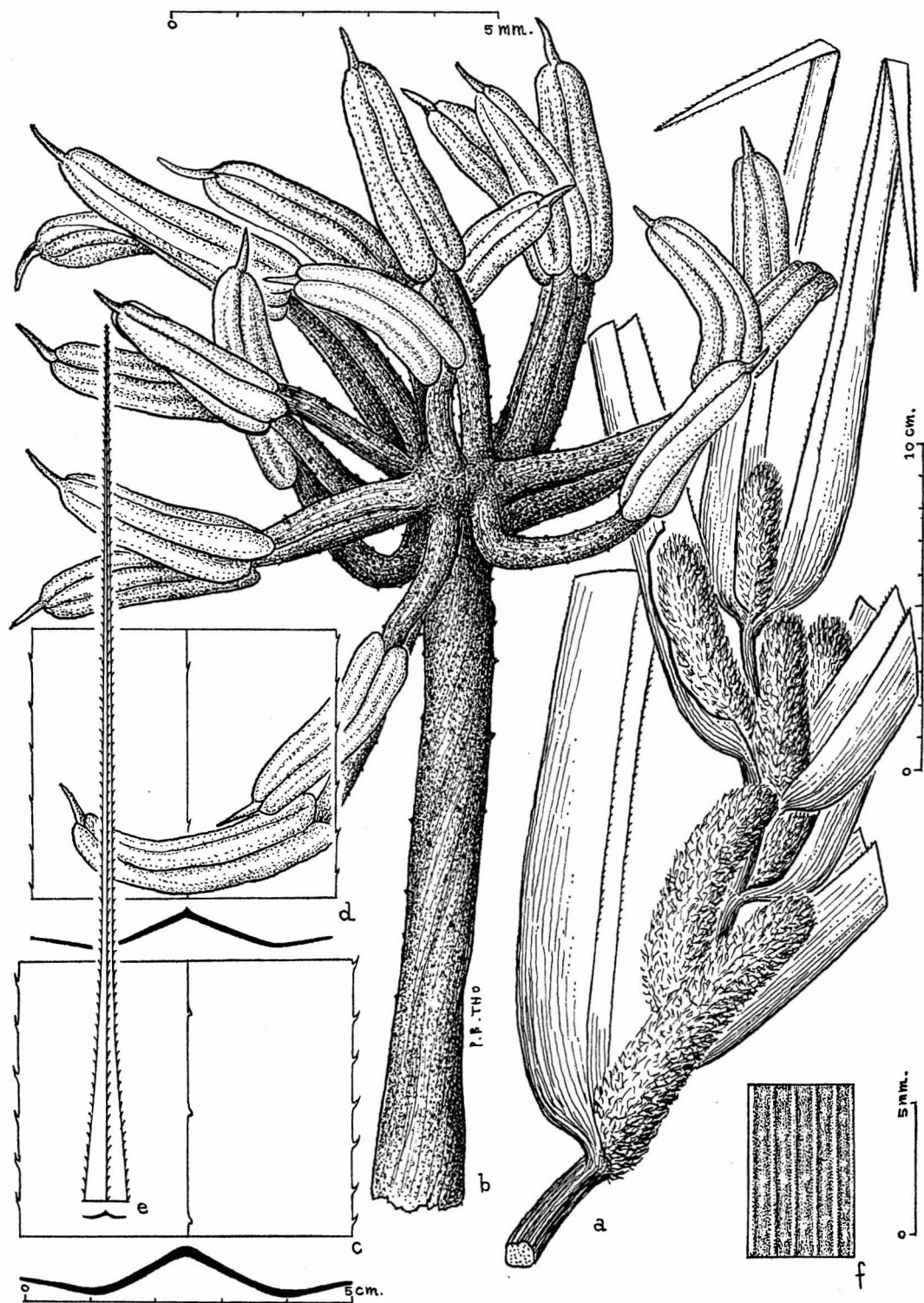


FIG. 216. *Pandanus elatus* Ridl., from Murray Hill Track, H. N. Ridley. *a*, Staminate inflorescence, $\times \frac{1}{2}$; *b*, column, filament tips, and anthers, $\times 10$; *c*, leaf base, lower side, $\times 1$; *d*, leaf middle, lower side, $\times 1$; *e*, leaf apex, lower side, $\times 1$; *f*, leaf veins at middle, lower side, $\times 4$.

ligulate, the margins with salient prickles 1–1.5 mm long, 1–2 mm apart; spikes about 7–10 and 6–9 cm long, 1.5–2 cm in diameter, densely flowered; stamens in fascicles 12–18 mm long, with 15–23 anthers; column 7–9 mm long, papillose, bearing the anthers at its apex in an umbel; free filament tips 2–5 mm long, minutely papillose; anthers 3–4 mm long, more or less narrow oblong, but tapering upwards, bearing at its tip a 0.4–0.6 mm subulate projection of the connective.

LECTOTYPE: Indian Ocean, Christmas Island, plateau, Oct. 1904, *H. N. Ridley* (SING). Type examined! Isotype (K)!

SPECIMENS EXAMINED: Christmas Island, Murray Hill Track, Oct. 1904, (staminate), *H. N. Ridley* (SING).

Pandanus nativitatis Ridl. (sect. *Pandanus*),
R. Asiat. Soc., Straits Br., Jour. 45:238–
239, 1906
Fig. 217

DIAGNOSIS OF HOLOTYPE: "Bushy; branches about 2.7–4.7 m. tall; leaves 2 m. or more long," 6.4 cm wide, coriaceous, at midsection with 46 or 47 secondary parallel veins in each half, but no visible tertiary cross veins, swordlike, gradually tapering to the 12 cm trigonous subulate apex, this 10 cm down 4 mm wide, lamina furrowed above the midrib and with 2 rounded pleats, the base not preserved, but near it the margins with prickles 1–3 mm long, 2–5 mm apart, stout subulate, pale, somewhat ascending; the midrib below, beginning at about 27 cm with prickles 2–2.5 mm long, 10–24 mm apart, slender subulate, arcuate, ascending; at midsection the margins with prickles 1–1.5 mm long, 3–6 mm apart, subulate, appressed ascending; the midrib below with prickles 1–1.5 mm long, 6–11 mm apart, deltoid subulate, slightly ascending; the subulate apex with the margins essentially unarmed; the midrib below with serrulations 0.3–0.4 mm long, 2–5 mm apart; pistillate inflorescences terminal, bearing one syncarp; peduncle more than 12 cm long, 2 cm in diameter, 3-sided, leafy bracted; syncarp "orange, as big as a man's head." Phalanges (3 seen) 5.3–5.7 cm long, 5 cm wide, 4.3 cm thick, cuneate quadrate, the apex low convex, upper $\frac{2}{3}$ free, lateral sutures deep in free part, the

sides flattish or gently convex, smooth, shining, 5-angled; sinuses of small central apices 2 mm deep, of the larger marginal ones 4–6 mm deep, the depth mostly in the narrow V-shaped bottom; carpels 9 (but in a double the carpels 23 and the phalange 8.5 cm wide), the apices of the marginal ones broad and retuse, with a large concavity distal of the stigma; central carpels with apices $\frac{1}{3}$ – $\frac{1}{2}$ the size of the others, low pyramidal-convex, lacking the apical concavity; stigma 1 mm long, transversely elliptic, flush or oblique, centripetal, creased, brown, papillose, proximal crease deep, usually extending to the valley bottom; endocarp supramedian, bony, dark brown, the lateral walls 3–4 mm thick; seeds 11–15 mm long, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern traversed by several strong fibers; basal mesocarp fibrous and fleshy.

HOLOTYPE: Christmas Island (Indian Ocean), Waterfall, Oct. 1904, *H. N. Ridley* (SING).

Pandanus Hendersonii sp. nov. (sect.
Pandanus)

Fig. 218

DIAGNOSIS HOLOTYPE: Arbor 2.7 m alta, foliis 1.01–1.53 m longis 4–5 cm latis coriaceis supra viridibus infra subpallidioribus supra midnervum sulcatis et cum plicis binis obtusis in sectione mediali cum 38–42 nervis secundariis parallelis in quoque dimidio nervis tertiis non evidentis lamina gladiformata ex basi sensim in apice 15 cm longo trigono subulato diminuenti eo 10 cm ex apice 4 mm lato basi amplexicauli et inermi sed ex 4–5 cm marginibus cum aculeis 1.5–5 mm longis 3–12 mm separatis subulatis pallidis adscendentibus, midnervo infra ex 11 cm cum aculeis 1.5–2.5 mm longis 13–21 mm separatis crassiter subulatis reflexis, in sectione mediali marginibus et midnervo infra cum aculeis 2–2.5 mm longis 4–8 mm separatis subulatis adpresse adscendentibus apicibus brunneis, in apice subulato marginibus et midnervo infra cum serrulis 0.2–0.5 mm longis 1–8 mm separatis, infructescentia pendenti cum syncarpio unico, pedunculo 20 cm et plus longo folioso-bracteato, syncarpio 19 cm longo 11 cm diametro anguste obovoideo-ellipsoideo subtrigono cum 70 phalangibus eis 4.5–5 cm longis 2.8–4 cm latis 2.4–3.4 cm crassis pyriformatis

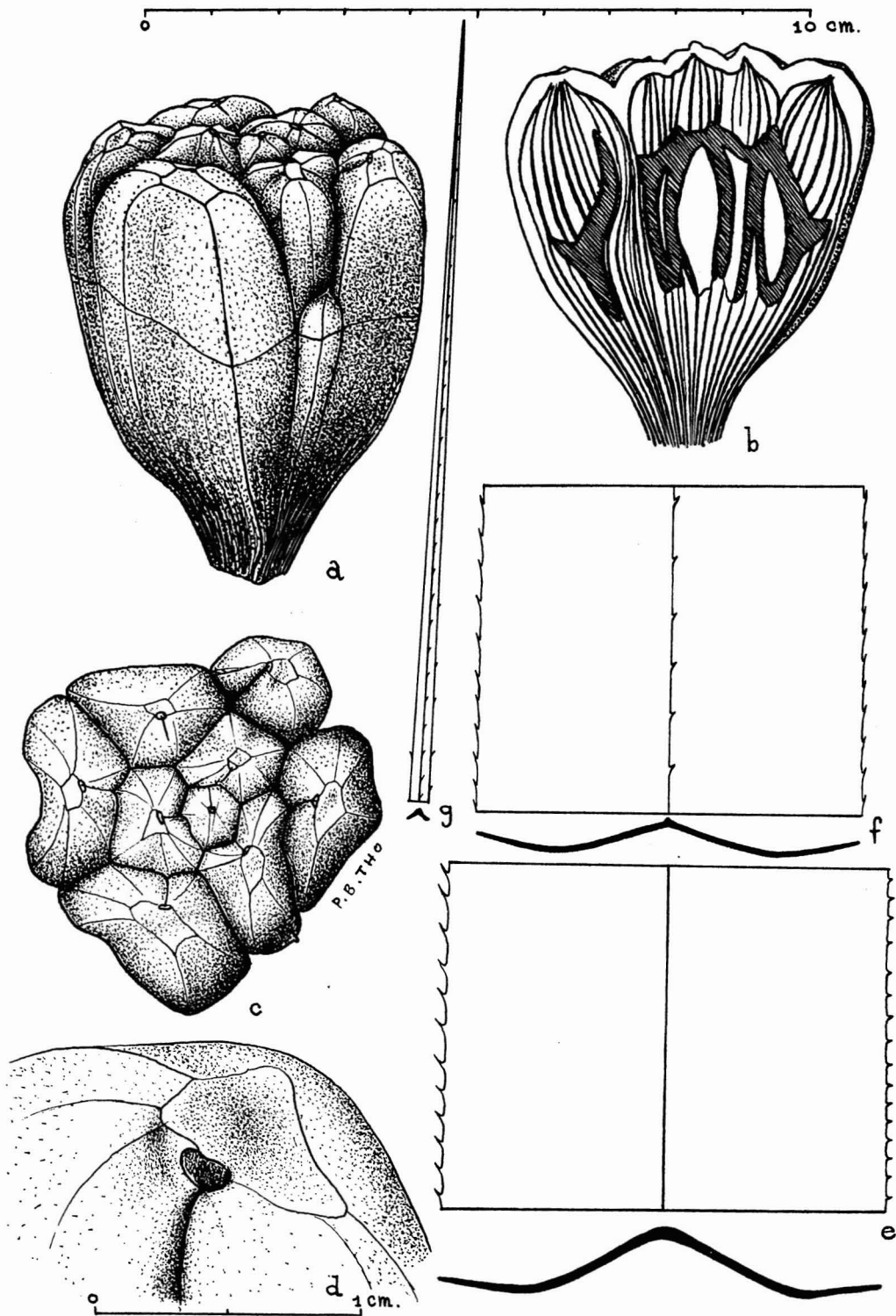


FIG. 217. *Pandanus nativitatis* Ridl., from holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

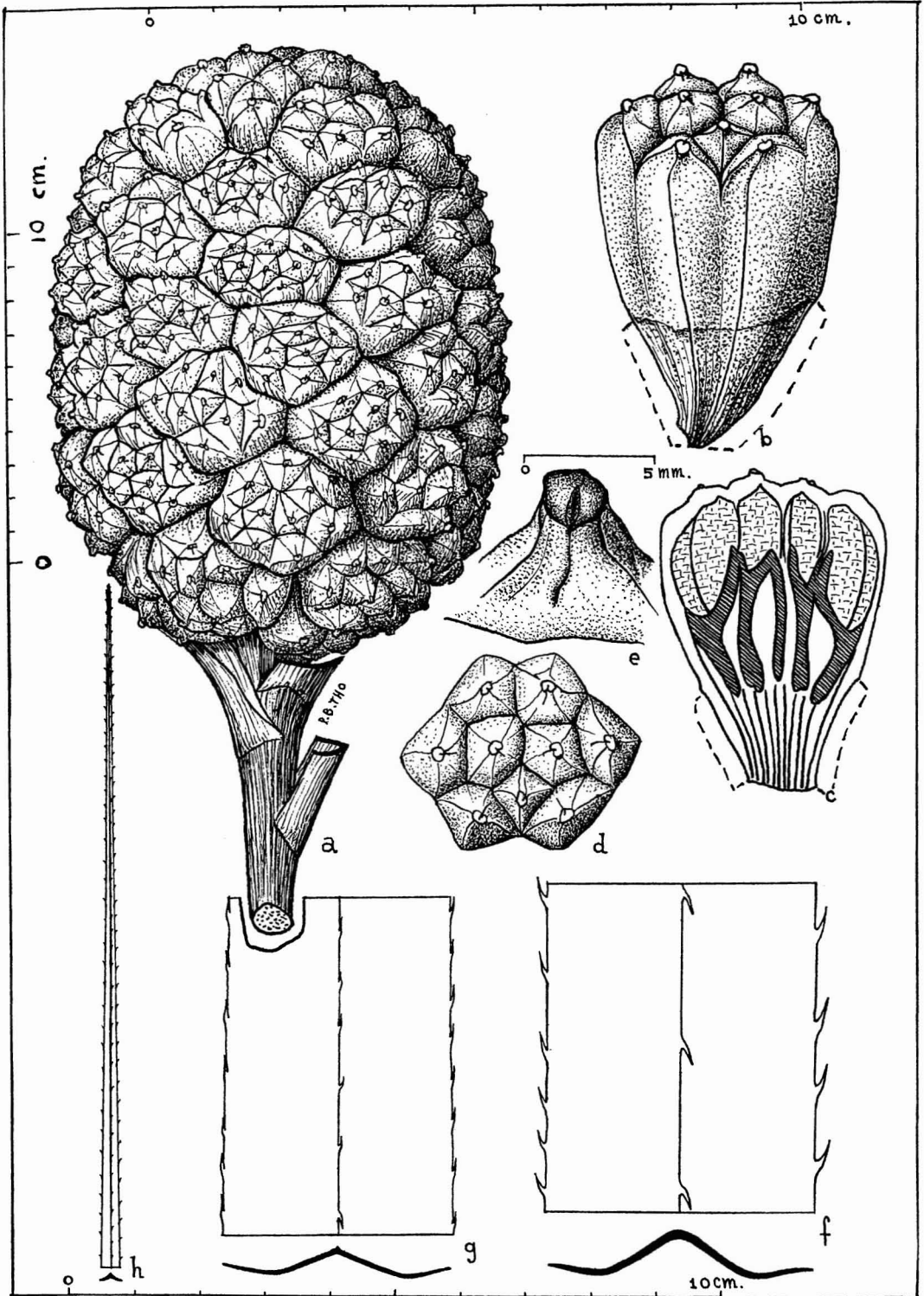


FIG. 218. *Pandanus Hendersonii* St. John, from holotype. *a*, Syncarp, $\times \frac{1}{2}$; *b*, phalange, lateral view, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

aurantiaco-rubris et luteis parte $\frac{3}{5}$ supra libera 5–6-angulosa, apice convexo lateribus subcurvatis vel subplanis laevibus lucidis, suturis lateribus nullis, sinibus centralibus apicalibus 3–4 mm profundis anguste V-formatis in centro recto vel subcurvato, carpelis 7–11 plerumque 8–10 apicibus obtusis vel depresso obtusis pyramidalibus, parte $\frac{3}{5}$ infera carnosio-incrassata, stigmatibus 2–2.5 mm longis elevatis horizontalibus vel obliquis suborbicularibus vel cordatis vel transverse ellipticis sulcatis brunneis papillosis centripetalibus, sinibus proximalibus latis $\frac{1}{2}$ ad fondam extensis, endocarpio subsupramediali 2 cm longo osseoso obscure mahoganicolorato lateribus 1.3–1.5 mm crassis intra laevibus lucidis, seminibus 9–11 mm longis ellipsoideis, mesocarpio supero in apice carpelae quaeque cavernam cum membranis albis et fibris paucis formanti, mesocarpio basali fibroso et carnosio.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Treelike, 2.7 m tall; leaves 1.01–1.53 m long, 4–5 cm wide, coriaceous, green above, slightly paler green below, furrowed above the midrib, with 2 rounded lateral pleats, at midsection with 38–42 secondary parallel veins in each half, tertiary veins not evident, blade sword-shaped, tapering gradually from the base to the 15 cm trigonous subulate apex, this 10 cm down 4 mm wide, the base amplexicaul and unarmed, pale, but beginning 4–5 cm up the margins with prickles 1.5–5 mm long, 3–12 mm apart, subulate, ascending, pale; the midrib below beginning at 11 cm with prickles 1.5–2.5 mm long, 13–21 mm apart, stout arcuate subulate, reflexed; at midsection the margins and midrib below with prickles 2–2.5 mm long, 4–8 mm apart, subulate, appressed ascending, brown-tipped; on the subulate apex the margins and midrib below with serrulations 0.2–0.5 mm long, 1–8 mm apart; infructescence pendent, with one syncarp; peduncle 20 cm or more in length, leafy bracted; syncarp 19 cm long, 11 cm in diameter, narrowly obovoid-ellipsoid, perceptibly 3-sided, bearing 70 phalanges, these 4.5–5 cm long, 2.8–4 cm wide, 2.4–3.4 cm thick, pyriform, orange-red and yellow, upper $\frac{3}{5}$ free and 5–6-angled, the apex convex, the sides gently curved or almost plane, smooth, shining, lateral sutures none; central apical sinuses 3–4 mm deep, narrow V-shaped only at the center,

straight or gently curved; carpels 7–11, mostly 8–10, the apices from obtuse to low obtuse pyramidal; lower $\frac{3}{5}$ of phalanges fleshy enlarged, as shown by the persistent shoulders; stigmas 2–2.5 mm long, elevated, horizontal or oblique, suborbicular, cordate, or transversely elliptic, creased, brown, papillose, centripetal; proximal sinus wide, running $\frac{1}{2}$ way to valley bottom; endocarp slightly supramedian, 2 cm long, bony, dark mahogany-colored, the lateral walls 1.3–1.5 mm thick, the inner surfaces smooth, shining; seeds 9–11 mm long, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern with an aerenchyma of white membranes and a few fibers; basal mesocarp fibrous and fleshy.

HOLOTYPE: Indonesia, Anamba Islands, Pandang, near Letong, Jemoja, sea level, 12 April 1928, *M. R. Henderson* 20,365 (SING). Isotypes (BO, K)!

SPECIMENS EXAMINED: Anamba Islands, Tanjong Suka, Siantan, among rocks near sea, 5 April 1928, *M. R. Henderson* 20,222 (K, SING).

DISCUSSION: *P. Hendersonii* is a member of the section *Pandanus*, as is its closest relative, *P. rubricoloratus* St. John, from Pulau Tioman, off the east coast of Malaya. The latter species has the syncarp 9 cm long, globose; phalanges 3.6 cm long, red, the central apical sinuses 0.5–2 mm deep; endocarp inner surfaces papillose and a little shiny; leaves 66–73 cm long, 2.8–3 cm wide, at midsection with 27 secondary parallel veins in each half and the midrib below with prickles 1.5–2 mm long, 6–13 mm apart, *P. Hendersonii* has the syncarp 19 cm long, obovoid-ellipsoid; phalanges 4.5–5 cm long, orange-red and yellow; central apical sinuses 3–4 mm deep; endocarp inner surfaces smooth, shining; leaves 1.01–1.53 m long, 4–5 cm wide, at midsection with 38–42 secondary parallel veins in each half, and the midrib below with prickles 2–2.5 mm long, 4–8 mm apart.

The second collection, Henderson 20,222, is identical with the type except for having a smaller syncarp with smaller phalanges (about 3.9 cm long). From their structure and appearance, this difference is judged to be due to immaturity.

This new species is named in honor of M. R. Henderson, former director of the Singapore Botanic Garden.